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SELECTIONS FROM THE RECORDS OF THE BOMBAY GOVERNMENT.

No. XCIX.—New Series.

PRÉCIS

OF THE

CORRESPONDENCE ON THE SUBJECT OF LIGHTING UP THE ENTRANCE

TO THE

HARBOUR OF BOMBAY.

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Bombay:
PRINTED FOR GOVERNMENT
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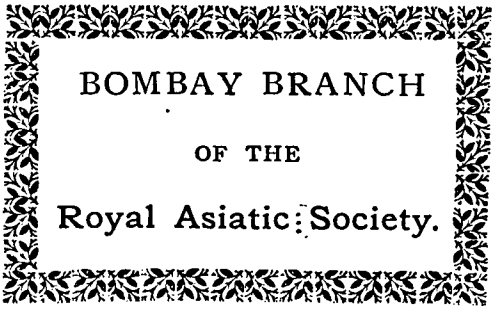

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PRECIS

OF THE

CORRESPONDENCE ON THE SUBJECT OF LIGHTING UP THE ENTRANCE TO THE HARBOUR OF BOMBAY.

1. The subject was laid before Government for consideration in a Report* (which is published in extenso in the next paragraph) from Captain W. C. Barker, Conservator of the Port, in which, after reviewing the existing means for the purpose, he proposed the following as what should be done with respect to the lighting up the entrance to the Harbour :—

* No. 129 of 18th June 1860.

1*st.*—A new Lighthouse, painted white, on the extreme edge of the S. W. Prong. It should have a first class *Revolving* light, 150 feet above high-water mark.

2*nd.*—A loftier Flagstaff at Malabar Point.

3*rd.*—A new Lighthouse, painted white and red, in horizontal lines, at Kennery. It should have a first class *Fixed* light, 180 feet above high-water mark.

4*th.*—A martello tower on the "Sunken Rock," displaying from its summit a *Fixed* light of the 2nd or 3rd class.

5*th.*—The inner and outer Light Ships to be then removed.

2. Captain Barker's Report alluded to above is as follows :—

"I have the honour of submitting the following Report on the Lighthouses, Light Vessels, Beacons, and Beacon Buoys of this Harbour.

"2. I would premise that I am aware that of late years many and various schemes for the improvement of the Port of Bombay, both with regard to the efficient Lighting and Pilotage as also the Harbour Defences, have been submitted to Government for consideration, but little has yet been done towards carrying into practical effect what every one acknowledges to be so highly necessary.

"3. I am at the same time aware that, in the present state of the public finances, it is hardly to be expected that Government will be disposed to undertake what is recommended in the following pages immediately; still I feel it my duty to lay before them what I consider so essentially necessary for the shipping interests of this great commercial Port, and for the benefit of Government.

"4. It is apparent to every one that the Port of Bombay is daily becoming of more importance both politically and commercially, possessing as it does all the essential requirements for the establishment of an efficient Naval Arsenal, and all the qualifications of a great commercial Port, capable of being rendered easy of access, to friends at all times, whether by night or day, and at all the seasons of the year; but at the same time, if not inaccessible, at least very formidable, to enemies. It is in fact the very key to our Indian Empire on the West Coast, and the Grand Depôt for Military Stores, and it is indeed surprising that its great capabilities have not long ere this been more fully developed.

"5. I propose in the first place noticing the boundaries of the entrance to the Harbour—the Lighthouses, Light Vessels, Beacons, and Beacon Buoys as they exist at present; secondly, to suggest what I consider necessary towards the efficient lighting up of the entrance to the Harbour; and, thirdly, to point out what may be done towards protecting the entrance to the same, and of our mercantile fleet.

"6. Kennery or Kundaree Island marks the boundary of the entrance to the Harbour on the south side. It is a small rocky Island, bearing from the Lighthouse south distance 11¾ miles, and is elevated near 100 feet above the level of the sea.

"This is the point all vessels should endeavour to make (especially during the South-West monsoon) in running for the Harbour.

"7. To the North the entrance to the Harbour is known by Malabar Hill, with its low insignificant Flagstaff half way down the brow of the hill, and by the Lighthouse. This latter is situated at the extreme south end of Colaba, and is elevated about 130 feet above low-water mark.

"The Light displayed is a Revolving Light visible from the deck of a ship, in ordinarily clear nights, about 16 or 18 miles. It is not

easily discernible during the day on account of the adjacent trees and buildings.

"The South-West Prong extends to the South-West of the Lighthouse, a distance of 2¾ miles, drying at low-water spring-tides to a distance of 1¾ miles.

"8. The Fair-Way to the entrance of the Harbour is marked by a floating Light Vessel, moored equi-distant about 2 miles from the extremity of the South-West Prong, and the foul ground off Thull, is seven fathoms at low-water spring-tides. The following are the bearings and distances of the principal points from the outer Light Vessel:—

Malabar Point Flagstaff N. 4 deg. 50 E. distance 6·90 miles.
Lighthouse, N. 21 deg. to 50 min. E. 4·53 miles.
South-West Prong extremity North, 2 miles.
Inner Light Vessel, N. 38 deg. 50 min. E. 4·68 miles.
Middle of Thull Shoal, E.S.E. about 2 miles.
Kennery or Kundaree Island, S. 14 deg. E. nearly 7½ miles.

"9. This vessel (built especially for the purpose) took up her station early in 1842, displays a bright Light at her mast-head from sunset to sunrise, is visible 10 to 12 miles from a ship's deck in clear weather; a Blue Light is burnt every hour during the night, and a torch at the half hours. During the day a red ball is shown from the mast-head, and on a sail being signalled a red flag is hoisted.

"10. Notwithstanding that this vessel is moored with very heavy cables and anchors, she has broken adrift several times (twice during last South-West monsoon). Of course this is more likely to happen in very bad weather, when such a guide to the entrance of the Harbour (more particularly with the Lighthouse in its present position) is most urgently required.

"11. About ¾ of a mile North-East by North of the outer Light Ship is a large wooden Buoy, which has a spiral top, painted red, called the Fair-Way Buoy; this has also broken adrift several times, and of course is more likely to do so in very bad weather.

"12. The Inner Light Vessel (an old dismantled Schooner of about 90 tons) is moored to Southward of Sunken Rock, and bears from Outer Light Vessel N. E. ½ North 4½ miles. This vessel has

a red ball at her mast-head, displays a bright light from sunset to sunrise, and a red flag at her mast-head during the day on a ship being signalled at the Lighthouse. About ¼ of a mile to N.N.W. is a red Buoy, marking the exact position of the Sunken Rock. The concluding remarks of the last two paragraphs are also applicable to the Inner Light Vessel and Buoy. The Inner Light Vessel broke adrift once last South-West monsoon.

"13. Beside the above there is a Beacon (a white stone pillar about 24 feet high) on the 'Oyster Rock,' a small Lighthouse on the 'Dolphin Rock' displaying a green Light to the Southward and Eastward, and Bright Light to the Northward, dark to the Westward. This latter was erected at the close of the year 1856, but strange to say accommodation for the men necessary to keep the lamps trimmed was entirely lost sight of in the construction of this building; this is now being remedied.

"14. The middle ground Shoal is defined by a chequered white and black Buoy to the Southward and a black Buoy to the Northward; both are of Iron.

"15. The Flagstaff Shoal by a large red Buoy.

"16. The Northern patches between the last named Shoal and Cross Island are marked by small Iron Buoys.

"17. There are also small Iron Buoys, marking the Northern and South-East edges of the Reef off Butcher's Island, and a Buoy marking the position of a small patch of rocks on North-Eastern verge of reef of Caranja Island.

"18. Having thus described the principle points marking the limits of the entrance to the Harbour, as also the Lighthouses, Light Vessels, Beacons and Beacon Buoys as they at present exist, I will now proceed to show what I consider necessary should be done with regard to so important a matter as the lighting up the entrance to the Harbour.

"19. Lighthouses should be erected, if possible, on the dangers they are intended to guard against, and not (as is the case with the present Lighthouse at Colaba) two miles and three-quarters within the danger.

"20. The utility of Floating Light Vessels cannot for a moment be called in question, where the cost is low, and where

sunken rocks and hidden dangers extend a considerable way to seaward; but for this Port they are not only unnecessary but often mischievous, for, as I have observed before, at the very time they are most urgently required, namely, in extremely bad weather, they are most likely to break adrift.

"21. Before the present Floating Light Vessels can be dispensed with, it is necessary to make a radical change in the present bad system of lighting up the approach to the Harbour.

"22. In the first place I would recommend that a Lighthouse be erected on the extreme edge of the South-West Prong, where it dries at low-water spring-tides. It should be a first class Revolving Light, and elevated 150 feet above high-water mark, so as to be visible from the deck of a ship in clear weather 18 to 20 miles.

"23. I would also recommend that a loftier Flagstaff be erected on Malabar Point, so as to appear well above the trees and buildings in the vicinity. The approach to the Harbour on the North side would then be clearly defined.

"24. Kennery or Kundaree Island is elevated, as before stated, about 100 feet above the level of the sea on its highest point. I would recommend the erection of a Lighthouse some 80 feet above the summit, or 180 feet above the sea, to show a fixed bright light of the 1st class, so as to be visible in ordinary weather 20 to 22 miles from the deck of a ship. This Lighthouse should be painted in alternate red and white broad bands or belts horizontally. The Lighthouse at the end of South-West Prong should be all white, then there could not possibly be any chance of mistaking one for the other either by night or day.

"25. A double light on Kennery was advocated by the Committee appointed by Sir Henry Leeke to report on the subject of an improved system of Lighting Pilotage. I do not see the utility of a double light when the latter would answer every purpose.

"26. The Sunken Rock, I am aware, is very small, but it is by no means impossible to erect a martello tower thereon, which would assist materially in defending the entrance to the Harbour, and at the same time by displaying from its summit a bright fixed Light of the 2nd or 3rd class, so as to be visible 5 of or 6 miles from a

ship's deck, would thus complete the lighting up of the entrance to the Harbour. Both Inner and Outer Light Vessels might then be removed.

"27. Thirdly, with regard to defending the entrance to the Harbour, the intervening space on the South-West Prong, between the proposed new Lighthouse and the Southern end of Colaba, might in the course of a few years be all reclaimed from the sea, and form an excellent site for a series of Batteries, which would thus add greatly to the strength of the Harbour Defences now in course of construction. For the erection of these works we have ample materials in close proximity, and let it not be forgotten that we have certain fine weather for at least eight months in the year, so that the works may be carried on progressively and surely.

"28. But whatever may be determined with regard to the Harbour Defences, years must elapse before they can be sufficiently advanced to resist the entrance of a hostile fleet. I cannot for a moment suppose that an enemy's fleet would venture to appear unless assured of the absence of men-of-war sufficient to protect the shipping; but with the present fortifications, a couple of smart Frigates, well handled, could, in my opinion, either capture or destroy the whole of the mercantile fleet with almost entire impunity to themselves as the ships are now anchored.

"29. I would suggest, in the event of a hostile fleet being expected, that the shipping be moved to the Northward of Butcher's Island and Elephanta Island, and to the deep-water anchorage off the old Fort on East end of Trombay Island; by throwing up Batteries on Butcher's Island, Elephanta, Trombay, and on the Northern end of Caranja, the shipping would thus be completely protected.

"30. There is smooth and deep water close to the Island of Trombay. By the construction of a few piers on piles or arches, so as not to obstruct the tidal scour, ships might haul alongside to discharge and receive cargo. This spot is only distant from the Railway about 4½ miles. Would not this obviate the necessity for Wet Docks, and be less costly?

"31. By removing merchant vessels from their present anchorage, the guns on the eastern or Harbour face of the Fort might

then be made available for the defence of the Port, which they certainly could not be as the ships are now berthed.

"32. Since writing the above intelligence has been received of the total wreck of the American Ship 'Squantum' some 12 to 16 miles to the Southward of Kennery (exact particulars not yet known), which induces me to think that had there been a Lighthouse on Kennery Island, as suggested by me in the 24th paragraph, this calamity would probably have been averted.

"33. The erection of a Lighthouse on the extremity of the South-West Prong could only be carried on during the fine season, whereas the erection of a Lighthouse on Kennery Island could be proceeded with at all seasons. It would therefore be of more advantage to the shipping interests if the latter was first commenced.

I have the honour to be, &c.

W. C. BARKER, Captain, I.N.,
Master Attendant and Conservator of the Port."

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3. Government ordered the foregoing report to be sent to the Chamber of Commerce for their opinion and suggestions.

Marine.—G. R. No. 580 of 14th July 1862.

4. In the meantime Government received a report on the same subject from Mr. Kennelly, dated 5th August 1862, in which the following proposals were made to improve the lighting of the Harbour entrance :—

1*st*.—To erect a Lighthouse on wrought iron screw piles, in Latitude 18·44·48 North and Longitude 72·41·10 East, to be called the "Bombay Direction Lighthouse." It should have a first class *Revolving* Light, flashing every 20 seconds, and elevated 100 feet above high-water mark. The Lighthouse to be painted in alternate white and black bands.

2*nd*.—To shift the outer floating Light Vessel 3½ miles nearer to the Harbour, and call it the "Fairway Light," until it can be substituted by a Lighthouse on piles exhibiting a *Fixed* light of the 2nd class.

3*rd*.—To substitute *red* shades for the *green* shades at the Dolphin light.

4*th*.—To abolish the Colaba Light and the Inner Light Vessel.

5. This report of Mr. Kennelly was also ordered by Government to be sent to the Chamber of Commerce, to be considered along with Captain Barker's report.

Marine.—G. N. No. 741 of 30th August 1862.

6. In reply, the Chamber of Commerce suggested that Government should appoint a Commission to inquire into, and report on the subject; and a Notification was accordingly issued appointing the officers and gentlemen not connected with Government, named below, to assemble and report "on the lighting of the Bombay "Harbour, and to suggest any improvements in the Beacons or Buoys "which mark the danger thereof." Captain Barker's and Mr. Kennelly's papers were also to be considered at the same time by the Committee:—

Marine.—No. 907 of 25th October 1862.

President.

Captain J. Young, C.B.

Members.

The Commissioner of Customs.
The Master Attendant.
Lieutenant-Colonel DeLisle.
Robert Hannay, Esq.
J. Farrar, Esq.
W. Johns, Esq.
J. Dixon, Esq.

To the above was afterwards added the name of—

Member.

Mr. Andrew Grant, Agent for Lloyds.

7. The Commission, on the 31st January 1863, reported as follows:—

Bombay, 31*st January* 1863.

"From the COMMISSION appointed by Government Resolution No. 907, dated 25th October 1862, to report on the Lighting of Bombay Harbour, and to suggest improvements in the Beacons and Buoys which mark the dangers thereof.

"To Major W. L. MEREWETHER, C.B.,

Secretary to Government, Marine Department.

"SIR,

"We have the honour to forward the following report on the Lighting of Bombay Harbour, and suggestions for the improvement of the Beacons and Buoys which mark the dangers thereof.

"We have to recommend the following arrangements being carried out:—

"1*st*.—That the Lighthouse on Colaba,

"The Outer and Inner Light Ships, and

"The Dolphin Rock Lighthouse be continued in their present position.

"2*nd*.—That a Revolving Light of the first class be substituted in the Colaba Lighthouse for the Light at present exhibited, which is only a third class light.

"3*rd*.—That plate glass be fitted to the Dolphin Rock Lighthouse in place of the ordinary window glass now in use there; the colour to be continued the same as at present, viz. Green.

"4*th*.—In addition to the above, which constitute the whole of the Lights now exhibited, we suggest the erection on the northern part of the Island Kennery of two square Lighthouses, each 80 feet above the summit of the Island and about 180 feet above the Sea. Each Lighthouse to display from sunset to sunrise a bright fixed light of the first class. The Lighthouses to be 130 yards apart, and connected with a wall 20 feet high. The Lighthouses and the wall painted in alternate red and white bands, each band 10 feet wide. The Lighthouses to be north and south of each other.

"*5th.*—Our object in recommending the erection of these two Lighthouses displaying bright fixed lights is to prevent their being mistaken for either the Colaba Lighthouse, which displays a bright revolving light, or the Outer Light Ship which displays a single fixed bright light. The connecting walls and painted bands will form a Beacon to enable the Mariner in the daytime to determine at once that it is the Island Kennery which he sees; with this addition to the present Lights we are of opinion that the Harbour will be well and sufficiently lighted.

"*6th.*—We suggest that two Buoys in addition to those now in use be placed one on the north-west and the other on the south-west extreme of Caranja Shoal; the Buoys to be painted black, the north-west Buoy to have the letters $\frac{C}{N}$ (Caranja North) and the south-west Buoy the letters $\frac{C}{S}$ (Caranja South). The letters to be white, to distinguish them from the other Buoys in the Harbour.

"*7th.*—With reference to Government Resolution No. 1102, dated 15th December 1862, directing us to report on the efficiency or otherwise of the Pilot Establishment for the Harbour, we suggest that a Board be appointed by Government to consist of five persons, of whom one to be the Commissioner of Customs, who should be ex-officio President of the Board. Two to be persons possessed of good practicial knowledge of Marine matters; the fourth to be one of the Firm acting as Lloyds Agent in Bombay, and the fifth a gentleman to be selected by the Chamber of Commerce to represent the Mercantile Community. The Board to have full power to make and alter all regulations for the efficient discharge of all duties connected with the Pilot Establishment as well as the control of the Port Fund, provided that such regulations shall first have been submitted to, and obtained the sanction of Government, and that the Master Attendant and Conservator of the Port be the executive and responsible officer for carrying out the regulations of the said Board.

"*8th.*—As the question of Pilotage will form a part of the Harbour management, and will come under the consideration of the proposed Board, and as the representatives of the Chamber of Commerce express themselves perfectly satisfied, if this Board be ap-

pointed to represent their interests as large payers of Port and Pilotage dues, we do not consider that much good would be derived from summoning and examining witnesses; we therefore defer doing so until the sentiments of Government on the subject are communicated to us.

We have the honour to be, &c.

J. YOUNG, Captain, I. N.; *President.*
G. INVERARITY, Commissioner of Customs.
R. HANNAY.
A. DeLISLE, Lieutenant-Colonel, R.E.
W. C. BARKER, retired Captain, I. N.,
Master Attendant.
A. GRANT, Agent to Lloyds.
W. JOHNS.
JOHN DIXON, Surveyor to Lloyds.
J. FARRAR.

N.B.—The President adds this note to record that Captain Barker, Master Attendant, signs the Report on the understanding only that a separate Minute by him, dated 28th instant, is appended, which is accordingly done with supplemental remarks thereon by the other members of the Commission.

J. YOUNG, Captain, I. N.,
President."

MINUTE by Captain BARKER.

"I am of opinion that the whole proceedings of the Commission should be laid before Government.

"I submit that sufficient reasons are not shown for the rejection of my propositions 1 and 2 for lighting up the entrance to the Harbour, supported as the said propositions are by so large a majority of nautical and experienced men, as shown in the proceedings of the second day's meeting and noted in the margin.

In favour of Captain Barker's propositions—
No. 1. Red Light on Kennery Island 38
No. 2. Lighthouse on the extreme end of South-West Prong 50
No. 3. Retaining both Light Vessels in their present position 35

"With reference to my proposition No. 3, 'as to whether or not the Light Vessels should be retained in their present positions,' there can be

no doubt that it would be highly advantageous to the shipping interests to retain them.

"I would submit with due deference that the Commission have not complied with the instructions of Government as contained in Resolution No. 1102, Marine Department, 18th December 1862, inasmuch as 'the inefficiency or otherwise of the existing Pilot Establishment' has not been inquired into or reported upon.

"It cannot be supposed that any one would be selected for the important post of Master Attendant and Conservator of this great commercial Port without being duly qualified and competent to carry out the onerous duties laid down in Act XXII. of 1855 passed by the Legislative Council of India, and therefore if it is necessary to have a Board, the Master Attendant and Conservator of the Port should be a member thereof.

"The Port Officer at Kurrachee has been recently appointed (*vide* Government General Order, Marine Department, No. 157, dated 1st November 1862) Master Attendant of that Port and Commissioner in the Marine Department.

"The Master Attendant and Conservator of the important commercial Port of Bombay ought not surely to be placed in an inferior position.

"I am willing to submit to the opinion of the majority of the Commission, that it is not necessary to forward the detailed proceedings of each day, provided this 'Minute' be forwarded with the report.

W. C. Barker,
Retired Captain, I. N.

Office of the Master Attendant and Conservator of the Port,
Bombay, 28th January 1863."

MINUTE of the majority of the Commission on the Lighting of Bombay Harbour on the objections stated by Captain Barker to the Report of the Commission in its present shape.

"1. Captain Barker submits that sufficient reasons are not shown for the rejection of his propositions 1 and 2 for Lighting up

the entrance of the Harbour, and states that these propositions are supported by a large majority of nautical and experienced men. The question was fully discussed during the sittings of the Commission, and Captain Barker then readily added his own vote on the subject to those of the other members. His dissent at the present time therefore requires explanation, as well as his change of views in other respects since the sittings terminated.

"2. The removal of the present Lighthouse at Colaba, or rather the substitution for it of one on the Prongs, was negatived by the Commission, Captain Barker included, for the following reasons:—

1*stly*.—It is unnecessary: the Outer Light Ship, which is recommended to be retained in its present position, is quite sufficient to prevent ships running upon the Prongs.

2*ndly*.—If the Lighthouse is removed to the low-water mark of the Prongs it will still be at considerable distance from the extreme point of the danger it is intended to indicate.

3*rdly*.—The proposed Lighthouses on Kennery, *which under any circumstances are indispensable*, and the retention of the outer Light in its present position will, with the existing Lighthouse at Colaba, amply and safely define the entrance into the harbour;

and such being the case, it was held to be unwise to move to another and a new spot a long-established and well known Light, not to speak of the enormous expense which would, in the opinion of the Commission, be thus needlessly entailed upon Government by the removal of the present Colaba Lighthouse to the site proposed by Captain Barker.

"3. Captain Barker agrees with the other members of the Commission as to the retention of the Outer and Inner Light Ships and of the Dolphin Rock Lighthouse in their present position.

"4. Captain Barker submits that the Commission have not complied with the instructions of Government as contained in Resolution No. 1102. The Commission in their Report have given their reasons for this, and it will rest with Government to determine whether the inquiry ordered shall still be carried out.

"5. Captain Barker submits that the Master Attendant should be a member of the proposed Board for making and altering regulations for the efficient discharge of Port and Pilot duties. The majority of the Commission are of opinion that it is not desirable the Master Attendant should be both a member of the Board as well as the executive and responsible officer for carrying out their regulations and instructions. The Board will always hope that the officer so appointed by Government will retain their confidence; if so, he will invariably receive their support, and the Board will not fail to seek his advice and assistance on every requisite occasion.

"6. The detailed proceedings of the Commission are available if Government desire to peruse them.

"7. Captain Barker, during the Commission's proceedings, admitted the superior advantage of a double light on Kennery over a fixed red light, but now again starts his previous opinion that a double light is unnecessary, and that a single red or bright light would be more suitable. To this the majority of the Commission have to urge that the object of having a double Lighthouse on Kennery is to enable the Mariner *by day* or *by night* to determine at once that it is the Island of Kennery which he sees; this the *double Beacon* will ensure by day and the *double Light* by night, and there will be no possibility of the Lighthouses on Kennery being mistaken for the single one at Colaba. A Beacon exact in size and form with that of the Colaba Lighthouse was erected on Kennery in 1852, and at the very commencement of the first monsoon it led to the wreck of the ship *Christian*, and was blown down by order of Government to prevent further disaster. This the majority of the Commission consider a sufficient commentary on any renewed proposition for a single Lighthouse on Kennery.

"8. On the subject of a single Red light on Kennery having, as Captain Barker states, been supported by a large majority of nautical and experienced men, the other members of the Commission have only to add that the proposal for a double fixed light on Kennery was not circulated for opinions in the harbour or else-

where; the Commission did not consider it necessary to circulate it, and had they done so, they have no doubt the proposition would have taken precedence in public opinion of all those noticed by the Master Attendant.

J. YOUNG, Captain, I. N., *President.*
G. INVERARITY, Commissioner of Customs.
R. HANNAY.
A. GRANT, Agent to Lloyds.
W. JOHNS.
J. DIXON, Surveyor to Lloyds.
A DELISLE, Lieutenant Colonel, R.E.
J. FARRAR."

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8. On receiving the above report Government desired the Commissioners to report further whether they consider any substitution of a Light-house on the Prongs for one at Colaba objectionable in itself, or merely not worth the expense; and to state more fully the grounds of their objecting to the Master Attendant having a seat on the Board proposed by them; and Government ordered a copy of the Commissioners' report to be sent to the Chamber of Commerce.

Marine—G. R. No. 155 of 14th February 1863.

9. The following papers were laid before Government subsequent to their disposal of the Report of the Commissioners, and they are now printed in full for greater clearness as to the opinions expressed in them:—

"No. 20 of 1863.

"From the Secretary to the Chamber of Commerce,

"To Major W. L. Merewether, C.B.,
Acting Secretary to Government, Marine Department,
Bombay.

Bombay Chamber of Commerce,
Bombay, 25th February 1863.

"Sir,

"By direction of the Committee of the Chamber of Commerce, I have the honour to acknowledge receipt of your letter No. 155 of 1863, dated 14th February.

"The Committee of the Chamber of Commerce having carefully considered the Report on the Lighting of the Bombay Harbour, &c., concur in the opinions expressed by the Commission.

"They consider that with a double Light on Kennery, and the present Lighthouse at Colaba made one of the first class, it would be unnecessary, as well as unadvisable, to remove the present old-established Light.

"The proposal for a Harbour Board originated with the Committee of the Chamber of Commerce; they consider that a Board such as the one proposed would strengthen the hands of the Master Attendant, but they are of opinion that it would be far from desirable to have the executive officer a member of the Board sitting as it were in judgment on his own actions.

I have the honour to be, &c.

H. Brooke,
Secretary."

"From the COMMISSION appointed to consider the Lighting of Bombay Harbour,

"To Major W. L. MEREWETHER, C.B.,
Acting Secretary to Government.

Bombay, 27th February 1863.

"SIR,

"In reply to your letter No. 155 of 14th instant, we have the honour to inform you that we consider the substitution of a Lighthouse on the Prongs for the one at present on Colaba unnecessary for the following reasons :—

"The proposed double Light on Kennery.

"The present Colaba Lighthouse.

"The Outer and Inner Light Vessels in their present position clearly and simply indicate the passage into the Harbour, a simple straight course from the Outer to the Inner Light Vessel leading ships safely into the Harbour.

"The erection of a Lighthouse on the Prongs will not obviate the necessity of a Light in the position of the present Outer Light Ship, there being dangers eastward of a straight line from the proposed Lighthouse on the Prongs to the Inner Light Vessel, which do not exist in a straight line from the Outer to the Inner Light Vessels.

"The Commission would not be justified in recommending the enormous outlay that would be required for the substitution of a Lighthouse on the Prongs for the one on Colaba, unless some good would be likely to result from it, the probability of which is not apparent. The expense of its construction has so far deterred the majority of the Commission from recommending it.

"The Commission do not think that the erection of a Lighthouse on the Prongs would be likely to lead ships into danger, but the necessity for it is not seen.

"With reference to the 2nd paragraph of your letter under answer, the majority of the Commission object to the Master Attendant having a seat at the proposed Board, because he being the executive officer for carrying out the rules and regulations of the Board would have to deliberate and vote on his own actions and conduct.

"The opinion of the Commission as herein expressed, regarding the substitution of a Lighthouse on the Prongs, is concurred in by all the members excepting Captain Barker; that regarding the objection to the Master Attendant having a seat at the proposed Board by all excepting Captain Barker, Lieutenant Colonel DeLisle, and Captain Johns.

We have the honour to be, &c.

J. YOUNG, Captain, I. N.
G. INVERARITY.
J. FARRAR.
R. HANNAY.
J. DIXON.
W. JOHNS.
A. GRANT, Agent to Lloyds.
A. DELISLE, Lieut.-Colonel, R.E."

REMARKS by Captain BARKER *on the Minute of the Majority of the Commission on his Minute forwarded with the Report, and also on Captain Young's Remarks on the Acting Secretary to Government letter in the Marine Department No.* 155 *of* 14*th February* 1863.

The several paragraphs of the minute of the majority are commented upon as follows:—

Para. 1. "This statement is quite correct. My propositions 1 and 2 were supported by a large majority of nautical men; I did not readily add my vote to those of the other members, *but merely yielded to the majority.*

Para. 2. "In this I yielded, being in the minority; but I would observe that it has been fully proved by the many wrecks and dis-

asters we have had to deplore of late years that the Outer Light Vessel is not sufficient to prevent vessels running upon the Prongs.

Para. 3. "By removing the Lighthouse to the extreme end of the Prongs, as suggested by me, it will be 1¾ miles nearer to the danger it is intended to indicate than it is at present, it will stand out in bold relief from the land, and can be approached to within ¾ to 1 mile; at present it cannot be approached to within 2¾ miles from seaward.

Para. 4. "One Lighthouse on Kennery would answer the desired purpose, provided the Lighthouse at Colaba was removed to the end of the S.W. Prong, and would amply and safely define the entrance to the Harbour (even should the Outer Light Vessel break adrift, which has occurred several times). The expense of removing the Colaba Light I consider the Commission had nothing whatever to do with, that being a matter for the Government to decide upon.

Para. 3. "This is quite correct.

Para. 4. "I still retain the same opinion that the Commission have not complied with the instructions of Government, as laid down in Resolution No. 1102. The reason given by the Commission for not adhering to the instructions I do not agree with.

Para. 5. "If a Board is necessary, which I do not think it is, the Master Attendant and Conservator of the Port should be a member thereof. Act XXII. of 1855, framed by the Legislative Council of India, confers certain powers on the Master Attendant and Conservator of the Port entitling him thereto.

Para. 6. "I am of opinion that the proceedings should have been sent in without wanting to know whether Government were desirous or otherwise of receiving them.

Para. 7. "There cannot be the slightest doubt that two bright Lights would show better than one Red Light. The object in my recommending a *Red Light* was to render the Kennery Light as distinct as possible from the Colaba Light; but this is a mere matter of opinion. The double Light on Kennery I do not think at all necessary. The latter part of this paragraph I hesitate not to state is a mistake. The Beacon on Kennery Island was as different

as it was possible to make it from the Colaba Lighthouse. The Colaba Lighthouse is a round building perfectly smooth and chunamed white, has a dome with platform and a rail flagstaff which is considerably above the dome, two signal yardarms, and all the appliances belonging to a Lighthouse, whereas the Beacon on Kennery on approaching from seaward had the appearance of being built four-sided, tapering to the top, of rough stone of a darkish tinge. The Commission advanced one solitary instance of a vessel having been supposed to be lost through the Beacon being erected there, when we have proof of many having been lost for the want of a distinguishing mark.

Para. 8. "At the first meeting of the Commission a Secretary was appointed who was authorized to get the several propositions for improving the Port printed and circulated. Twenty-five copies were printed; each member of the Commission was furnished with a copy; the other copies were circulated amongst the shipping. The second meeting of the Commission was deferred to allow time to circulate and to obtain the opinion of nautical men thereon.

"A long interval was allowed to elapse between the first and second meetings of the Commission for the express purpose of circulating all the propositions relative to the improvement of the lighting up the entrance to the Harbour, &c., and the said papers were duly circulated by the Secretary, and the Commission were informed thereof.

"I am therefore at a loss to understand the assertion contained in the latter part of this paragraph.

"In conclusion I would observe that the great advantages to be derived by moving the Light on Colaba to the extreme end of the Prong, retaining the Outer Light Vessel, and building a Light on Kennery, are as follows:—

"Vessels coming from the southward—

"Outer Light Vessel and Lighthouse on the Prong in transit puts the Mariner on the edge of Kennery Flat, and therefore is a guide on approaching that danger;

"Vessels coming from the northward—

Outer Light Vessel in transit with Lighthouse on Kennery will take vessels well clear of the foul ground off the Prongs.

W. C. BARKER, Retired Captain, H. M. I. N.,
Master Attendant and Conservator of the Port.

Bombay, *February* 1863."

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10. A copy of all the foregoing papers were ordered by Government "to be tranferred to the Public Works Department, with a view to fulfilment of the following proposals of the Commission:—

Marine.—No. 517 of 14th May 1863.

"The substitution of a first class Light at the Colaba Lighthouse.

"The fitting of plate glass at the Dolphin Rock Light.

"The construction of Lighthouses at Kennery.

"As respects the dissent by Captain Barker, the Master Attendant, on certain points, Government saw no reason to doubt the soundness of the opinion of the majority, excepting perhaps on the one point of removing the Colaba Lighthouse to the Prongs."

"The arguments show that the Prongs would be the better "position irrespective of expense. The expense may be greater "than the amount of improvement would warrant, but it is worth "while to know what that expense would be. Captain Barker "should place himself in communication with the Engineer of the "Harbour Defences, and learn what might be the probable cost of "the measure."

11. A copy of all the papers was sent to Her Majesty's Principal Secretary of State for India on 3rd June 1863, with a recommendation that the same may be submitted to the Hydrographer to the Admiralty.

Marine.—Despatch No. 66 of 3rd June 1863.

12. A further despatch was sent to the Secretary of State on the 22nd June 1863 as follows:—

Marine.—Despatch No. 39 of 3rd June 1863.

"We have the honour to submit the accompanying copies of proceedings taken with a view to better lighting of Bombay Har-

bour, and to invite attention to the proposals of the Commission appointed by us for due inquiry.

"2. The principal proposals are the substitution of a 1st class Light at the Colaba Lighthouse, and the construction of Lighthouses on Kennery Island. In order to carry these into effect we have to ask your assistance in procuring the Lights.

"3. For making the specification for these Lights we respectfully suggest that the services of the Engineer to the Trinity Board be obtained, and that he be authorised to contract with the most approved maker for the supply.

"4. The Revolving Light for Colaba Lighthouse should be a Catadroptric Holophotal Light of the 1st order. It has to show 300° of sea horizon, and the time of flash should be as long as can be arranged, so that in the thick weather of the monsoon it may be more visible than a quick flashing one would be.

"5. The fixed Lights for Kennery Island will require 200° of sea horizon. The Island is 100 feet above the sea; it is proposed that Lighthouses 80 feet high be erected from which these Lights should be shown.

"6. The Engineer's opinion might also be asked as to the distance they should be apart to secure their showing double at 20 miles distance throughout the semi-circle to seaward, and whether it be necessary that these Lights should also be of the 1st order.

"7. The cost of these Lights will be defrayed from the Bombay Port Fund."

Marine.—No. 88, dated 31st August 1863.

13. The following reply was received from Sir Charles Wood, dated 31st August 1863:—

"Prior to the receipt of your Marine letter dated the 2nd of June last, No. 39, in which you have asked my assistance in procuring certain lights with a view to the better lighting of Bombay Harbour, the enclosures to your letter of the 3rd idem, No. 36 (which are the same as those subsequently forwarded with the letter No. 30) had been transmitted to the Lords Commissioners of the

Admiralty, to be brought to the notice of their Lordships' Hydrographer in accordance with your recommendation.

"2. I now forward for your information a copy of a letter from the Board of Trade from which you will observe that the Lords Commissioners of the Admiralty referred the question to that Board, together with a report from their Hydrographer upon the proceedings submitted by you. Copies of that report, and of a Memorandum by Captain Sulivan, R.N., C.B., the adviser of the Board of Trade in Lighthouse matters, are also furnished to you herewith.

Dated 8th August 1863.

Dated 28th July 1863.

Dated 8th August 1863.

"3. Having considered these papers in Council, I am of opinion that it will be better that I should not take any steps towards complying with the requisition conveyed in your letter No. 39 until you shall have had the advantage of perusing the professional remarks contained in those papers, and the opportunity of possibly modifying the view you had previously formed with respect to the number and nature of the Lights required.

"4. I shall therefore await a further communication from your Government upon this important subject, in which communication I request to be afforded the fullest possible information in this country in giving complete and speedy effect to the final decision at which you may arrive for the better lighting of the Harbour of Bombay."

"To the UNDER-SECRETARY of STATE for INDIA,
India Office, S. W.

"SIR,—I am directed by the Lords of the Committee of Privy Council for Trade to acquaint you, for the information of the Secretary of State for India in Council, that the Lords Commissioners of the Admiralty have forwarded to this Department, for the information of the Board of Trade, the printed copy of proceedings on the subject of the Lighting, &c. of Bombay Harbour, received by them from the India Office, also a report from the Hydrographer of the Admiralty on the subject.

"My Lords understand that these papers were sent by the India Office to the Admiralty in compliance with a wish expressed by the Bombay Government.

"My Lords have referred the papers to Captain Sulivan, R.N., their adviser in Lighthouse matters, and direct me, in transmitting to you (enclosed) the report from the Hydrographer of the Admiralty above referred to, to transmit also the enclosed Memorandum by Captain Sulivan

I have, &c.

W. D. FANE.

Office of Committee of Privy Council for Trade.
Marine Department, Whitehall, 8th August 1863."

LIGHTING THE APPROACHES TO BOMBAY.

"Although the India Board, when requesting in this letter 'the notice of their Lordships' Hydrographer' to the proceedings on the lighting and pilotage of the Port of Bombay, might not have been aware that these subjects are now turned over to the Board of Trade, their Lordships might consider the following brief remarks on the former of these subjects as not unworthy the attention of that Board.

"The natural formation of the coast land about Bombay in the low character of Colaba Point, the shoal approaches to the shore immediately to the southward, and the receding position to this land itself, all contribute to render the question of lighting the approaches to Bombay, in a manner satisfactory to the seaman, a subject for very careful consideration.

"The full measure of difficulty arising from this condition of coast about the mouth of an important Harbour is mostly found by seamen in the S. W. monsoon. Arrived there in foul weather with a strong gale when the land is concealed by mist or rain, and the shoal flat approach abovementioned is a wide waste of broken water, with his lead as his only guide, it is then that the absence of some off-lying islet with a beacon on it is keenly felt, and then that

between the squalls of rain when attempts have been made to sight the land that ships have been irretrievably lost.

"Still Bombay is not a Harbour the approaches to which should be allowed to remain in their present condition; the great importance of its position, its depth of water, large extent and connection with interior navigation, along with its great security for shipping and capabilities of improvement in regard to the requirements of a first-rate mercantile Harbour, point to it as a place for immediate attention where improvement should at once begin in earnest.

"Looking then on Bombay in this light, attention must first be directed to its approaches from sea. The principal want there is evidently an outlying Beacon to apprize the mariner of his proximity to the Harbour, and the first thing to be done is to avail ourselves of the most outlying land for that purpose. That would evidently be Colaba Point, which would give a position for a Lighthouse about a mile and a half to the S. W. of the present light, and assuredly this is the site on which this light should have been erected.

"Colaba Light in this position would there be on the most salient point (as it should be) of the coast, and would be most favourably placed for being seen by vessels approaching the Harbour. It should be a revolving light as at present, but instead of the unreasonable interval of 2½ minutes of darkness its period should not be more than half a minute (or even less), and it should have an horizon of 21 miles distance, and should be one of the best possible lights that could be procured.

"The present arrangement of an outer Light Vessel in the fairway of the entrance should be preserved, and the utmost pains should be taken, by giving her strong ground tackle, to enable her to keep her station in all weathers, and to prevent that breaking adrift which has occurred at a time when the assistance of her light is most wanted.

"The position of this Light Vessel would be about 2½ miles South by West of the site of the new Lighthouse on Colaba Point, a position but little in advance towards the offing. But in addition to her light if she could be provided with a steam whistle, such as

is used in Partridge Island Lighthouse in the bay of Fundy, she could then give warning to vessels six or seven miles in the offing even in the wind's eye of her. This in the bad weather of the S. W. monsoon would be invaluable, and no pains should be spared to keep this apparatus in efficient working order, as it would be an effectual safeguard for vessels that make direct for her in foggy weather.

"Still in ordinary bad weather it also appears desirable that vessels bound to Bombay should have a warning of their approach to that place outside of this light. It has been proposed to place a Lighthouse on piles about 7 miles S. W. of the present Colaba Lighthouse. This would be an experiment which might or might not succeed. A vessel even running foul of it might place the light keepers in imminent danger that might prove to be fatal. A less dangerous method, and one by no means so expensive, would be to moor a ball beacon (not so far out) such as is in use at a place called Spaner's Spit in the rock channel at Liverpool. This beacon, formed by a small vessel of compact shape, sharp at both ends, and decked over to keep out the sea, securely moored with heavy ground tackle in 6 fathoms water, carrying her ball at a moderate height, might ride well even when the Light Vessel had parted, and if she too should break adrift, would only cost the trouble of being replaced.

"In the dark rainy and misty weather of the S. W. monsoon such a beacon might guide vessels bound to the Harbour of Bombay to the position of the Light Vessel, and eventually enable them to enter it.

A. B. Becher,
For Hydrographer.

Hydrographer's Office, 28th July 1863."

MEMORANDUM BY CAPTAIN SULIVAN, R.N., C.B.

LIGHT, &c., BOMBAY HARBOUR.

"If in the first place the question of expense is set aside, I have no hesitation in recommending the plan of Captain Barker, which is founded on the following and now well established rules for placing lights:—

1. The light should be as near as possible to the danger.
2. Where practicable a Lighthouse should be preferred to a Light Ship.
3. A single light distinguished by its character should be used in preference to the now obsolete plan of double fixed lights.

"2. Supposing it to be desirable to do away with the Light Vessels, as recommended by Captain Barker, the Colaba Light should certainly be placed on the extreme of the Point at low water, or as near it as a safe foundation can be obtained. If that cannot be found, a screw-pile Lighthouse would, I think, answer for that position. It should be a first order revolving light of one minute interval, and not less than 100 feet above high-water.

"3. If a Martello Tower were erected on 'Sunken Rock' it would be in an admirable position for the defence of the Port, and a light on it would have the great advantage over a Light Vessel of enabling a band of coloured light to be used to guard vessels from the dangers outside; and thus with the better position of the Colaba Light, both Light Vessels might be dispensed with. Even if the Martello Tower were not built, it might be worth erecting either a pile or stone Lighthouse on the rock, and shifting the position of the Colaba Light in order to save the cost of two Light Vessels. But if neither of these plans is adopted, both Light Vessels should be retained as recommended by the Commission, and the removal of the Colaba Lighthouse would then be of less importance.

"4. Both the Commission and Captain Barker agree that it is important to place a light on Kennery Island, and of this there can be no doubt; but the Commission think it necessary to distinguish

it from Colaba Point by two lights. This is quite unnecessary, even if the retention of a fixed light in the Outer Vessel prevents a fixed light being placed on Kennery Island. One of the best and most distinctive lights now used is a flashing dioptric light of 10 seconds interval. It cannot possibly be mistaken for a revolving dioptric light with an interval of a minute; where not absolutely necessary for distinction, no dioptric revolving light should have a longer interval than one minute, as the period of brightness is so short in these lights compared with that in the old catoptric revolving lights, that with a long interval they are more difficult to make out.

"5. I have therefore no hesitation in recommending that a first order flashing 10 seconds light should be placed on Kennery Island in preference to the two lights recommended by the Commission. As the Island is 100 feet high, a Tower of 50 feet would be sufficient, unless trees which cannot be cut down require a greater height, as there is no advantage in having the light more than 150 feet above the sea. The shorter Tower would prevent its being mistaken for Colaba, and for greater distinction one should be painted with verticle red and white stripes, and the other with horizontal ones.

"6. There is another arrangement of the lights which would equally answer the purpose, and would make the floating light more powerful if that is considered desirable.

"7. It is to make the outer floating light a minute revolving light with three reflectors on a face, such as are used in several new Light Ships in this country. Then the Colaba Light should be a 10-seconds flashing light, and Kennery Island a first order fixed light.

"8. It might be difficult to alter the Colaba Light to a first order, as a lantern 13 feet diameter is required, and the Tower may not be large enough; for a second class light a lantern of 10½ feet only is required, and as the dioptric lights have now been so much improved, a second order light might be sufficient. The revolving and flashing lights of the second order are more powerful than fixed lights of the first order.

"9. The danger of the Light Vessel driving might be lessened by having a set of mushroom moorings and chains, such as are in use by the Trinity House, sent from England.

"10. The estimates given in the papers for the cost of screw-pile Lighthouses are far less than their cost has been in America and this country.

B. J. SULIVAN,
Board of Trade."

8th August 1863.

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14. The Government of Bombay ordered that copies of the foregoing papers, from the Secretary of State, should be sent to the Harbour Board.

Marine.—G. R. No. 1125 of 28th October 1863.

15. In the beginning of 1864 Government desired the Harbour and Pilotage Board to send the correspondence on the subject of lighting the Harbour to Mr. Parkes, C.E., at Kurrachee, for that gentleman's opinion as to the exact position and construction of any additional lights which may be requisite to carry out the views of Captain Barker. So far as they are supported by the opinions expressed in the accompaniments to the Secretary of State's Despatch (see paragraph 13 ante) Mr. Parkes was also to state probable cost of such Lighthouses, and the course he would propose to ensure their early and effective completion.

Marine.—No. 106 of 10th February 1864.

16. The reply of the Harbour and Pilotage Board, and Mr. Parkes' report which they handed up, are given below in full:—

No. 44 of 25th April 1864.

"To the SECRETARY to GOVERNMENT.

"SIR,—We have had under consideration the letter from the Right Honourable the Secretary of State for India, No. 88 of the 31st August 1863, with its accompaniments, in connection with the improvement of the Lights of the Harbour of Bombay, and after due deliberation, beg to state, for the information of His Excellency in Council, that notwithstanding the decision come to by the Pilotage Commission appointed by the Government of Bombay, under Notification of the 25th October 1862, that a removal of the present Lighthouse at Colaba is not called for, and although great consideration is due to the view thus expressed,

still as there appears to be a large preponderance of opinion in favour of a removal of the Lighthouse from its present position to the edge of the danger, or as near thereto as practicable, not only among the highest authorities in England, but also among those conversant with such matters on the spot, we would not be justified in recommending to the Government to carry out the plan proposed by the Commission, so far as regards the Colaba Light, and would suggest that the Light be removed from its present position to the extreme edge of the South-West Prong, where it dries at low-water spring-tides or as near thereto as safe foundation can be found.

"2. In compliance with the request of Government, communicated to us in Secretary Lieutenant Colonel Marriott's letter No. 106, dated 10th February 1864, we have been in communication with Mr. Parkes, C.E., during his recent short visit to Bombay, and have been favoured by that gentleman with a report which we now submit in original.

"3. In this report it will be seen that Mr. Parkes advocates a single Lighthouse at Kennery, the buildings to consist of a central Tower 80 feet high, and at a distance of 50 yards North and South, Light-keepers' dwellings connected with the Tower by crenellated walls. The Tower to exhibit a single light flashing every 10 seconds; or supposing the outer Floating Light could be made red, without objection, it is suggested that Kennery be then made to show a bright fixed light. This opinion coincides with that seconded by Captain Sulivan.

"4. Mr. Parkes further advocates the substitution of a Light on the Prongs in place of the present Colaba Lighthouse $1\frac{1}{8}$ mile from the present Lighthouse and $\frac{3}{4}$ mile from the deep-water Channel. He estimates the cost of this Lighthouse at £24,000, which amount we fear will eventually be found much within the necessary outlay. The substitution of a Tower in place of the present Inner Light Vessel he leaves to be determined by the local authorities.

"5. A light flashing every 10 seconds possesses doubtless a marked distinction over one that revolves once only in a minute, and the difference in ordinary times would be easily detected,

but we are of opinion that the distinction would not be so great in stormy weather, and that therefore the distinguishing mark of a double fixed bright light at Kennery is indispensable. Moreover care must be taken that the light be not capable of confusion with the jungle fires on the hills in the back ground, and the effect we consider can best be secured by the double fixed light recommended.

"6. We have not yet been able to obtain an estimate of the probable cost of erecting the proposed double Lighthouse on Kennery, but as there is a large quantity of good stone on the island, and no engineering difficulties to contend with, we believe the cost would not be very great, and as we consider it of the utmost importance that this work should be undertaken immediately, we beg to urge on Government the necessity for an early decision being arrived at respecting it. Whether the Colaba Light be ultimately removed or not, all parties are agreed upon the necessity of a Light on Kennery, and no reason now exists for the erection of the latter not being forthwith sanctioned and commenced.

"7. As the Port Fund is not in a condition to bear the cost of the proposed Lighthouses, we solicit the aid of Government towards defraying the same, and are confident that in a work of such national importance this aid will be readily given.

8. The substitution of a Tower Lighthouse on the Sunken Rock can be hereafter considered as soon as the work has been decided to be feasible, and its probable cost ascertained; there is no immediate necessity for the alteration in this respect suggested by Mr. Parkes."

REPORT OF WILLIAM PARKES, C.E., ON LIGHTING THE APPROACHES TO THE PORT OF BOMBAY.

Bombay, 28th March 1864.

"To the SECRETARY HARBOUR and PILOTAGE BOARD, Bombay.

"SIR,—In compliance with your instructions to me forwarded upon a letter from the Secretary to Government to the President

of the Harbour and Pilotage Board, dated 10th February last, I have now the honour to report to you the result of my investigation of the above question.

"It is not within my province to discuss the various nautical arguments which have been brought forward.

"I conceive that the principles laid down in the Memorandum of Captain Sulivan, the highest authority of the day in Lighthouse matters, may be taken as established, and it only remains for me to point out how, and to what extent, they may be carried out.

"The recommendations to which these principles lead are—

'I. A powerful sea light on the Island of Kennery.

'II. The removal of the Colaba Light to the most southerly practicable position on the South-West Prong.

'III. The substitution of a Lighthouse on the Sunken Rock for the Inner Light Vessel.

"With regard to the first of these points little need be said. The Island consists of two knolls, the southernmost of which is rather the higher, but does not present sufficient surface for buildings of such a distinctive character as is required.

"The northernmost knoll is in every way suitable for the purpose, and I would recommend that the buildings consist of a central tower 80 feet high, and at a distance of 50 yards north and south, light-keepers' dwellings connected with the tower by crenellated walls. This will present a range of buildings towards the sea, which during the day will enable the seaman at once to identify his position.

"At night a light flashing every 10 seconds will give a marked distinction from any other light in the neighbourhood, or if it should not be thought objectionable to make the outer Floating Light red, the Kennery might be a bright fixed light. This would effect an economy of about £1,000.

"On the other hand the objection to establishing a new fixed light so near to the other Outer Light Vessel, where one of a similar description has been long in action, should have its full weight. The decision of this question should be left to the nautical authorities.

"The erection of the buildings on Kennery would be a very simple and inexpensive operation. The island contains in the old fortifications abundance of suitable stone ready quarried, and a good supply of fresh water. There is landing on the eastern side in all weathers.

"I have conferred with Lieutenant Colonel Jones, who has given much consideration to the matter, and have furnished him with some details of the special requirements for a Lighthouse. He will submit to Government a design for the buildings, embodying the general features we have together determined on. Such buildings in a similar situation off the coast of England would cost from £3,000 to £4,000, and the lantern, light apparatus, and other details sent from England, and their erection, would cost under £4,000 or £5,000 in addition according as the light be fixed or flashing.

"The removal of the light from Colaba Point to the Prongs is a more complicated question. I visited the proposed site in company with Captain Barker and Colonel Jones, and a spot was found suitable for the foundation $1\frac{1}{8}$ mile S. W. from the present Lighthouse, and $\frac{3}{4}$ mile from the deep-water channel off the end of the Prong. It would of course be practicable at a greater expenditure of time and money to place a light upon a site still further seaward, though I was informed that the site we visited was the outermost piece of solid rock; but even if time and money were not considered, I doubt if much advantage would be gained by going further out. There can be no doubt that the proposed site would be a great improvement upon the present site, and if it do not fulfil all the requirements of the optimist, I think it would be a great practical boon to the navigator.

"Colonel Jones and myself have conferred together upon the mode of construction, and he will submit a design based upon a Sketch I prepared, and which he approved, for a Stone Lighthouse, in which the light will be 150 feet above low water, or 18 feet higher than the present Colaba Light. I may state that the peculiarity of this climate offers a great advantage over that of England for the construction of all works within range of the tide. Though during the four months of the S. W. monsoon the work must be ex-

posed to a great force of sea, yet during the remaining eight months of the year little or no danger or interruption to the work is to be anticipated, and consequently the precautions which are necessary on the coast of England to secure against a storm which may come any day need only be taken once a year at Bombay. This simplifies the work materially, dispensing with all those ingenious but costly contrivances for locking and dovetailing the stones together which are sometimes assumed to be an essential feature of Lighthouse construction, but which are really unnecessary except where the work while in progress is liable to be acted on by heavy seas.

"The light should be a holophotal dioptric revolving one of the second order,* showing a flash once a minute. This as well as the lantern (of gun metal), the top gallery and floors of cast iron, and the stairs of wrought iron, should be manufactured in England. The cost of these portions of the work, including freight and erection, would be about £4,000, but I should state that this estimate, as well as that for the corresponding articles for Kennery, is only approximate. To make an exact estimate it would be necessary to refer to documents which I have not with me. Of the cost of masonry Colonel Jones will furnish an estimate. The cost of a similar Tower on the English coast, where suitable stone could be obtained as near as Bombay, would be probably £20,000, or, including the £4,000 above named, £24,000 for the complete Lighthouse.

"In order to carry out this work quickly and economically the first requisite is an experienced practical foreman (European or native) to superintend the landing and placing of every stone, and a small but efficient staff of workmen, the whole of whom should be irremovable from the work by any other authority but that of the Engineer in immediate charge. I expect that four seasons will be occupied with the work, but with a good and permanent staff it will progress steadily and without drawbacks, becoming also as it increases in height more and more valuable as a day beacon during thick weather. When completed it will be a structure worthy of

* Captain Sulivan suggests that it should be of the first order, and before the second order is adopted the matter should be referred back to him with the suggestion that two first order Lights so close together as Kennery and the Prongs would be are unnecessary.

the approach to such a Port as Bombay, which the present Colaba Lighthouse certainly cannot, so far at least as its position is concerned, be considered.

"With regard to the third point, the erection of a Lighthouse on the Sunken Rock, to replace the Inner Light Ship, I can say but little. The tides during my stay at Bombay did not give me an opportunity of examining the rocks, so I can give no opinion as to building upon it. Should the Prongs Lighthouse be executed, the Engineer in charge will obtain a special and local experience which will make him a better judge in the matter than I can be now.

"Even if commenced a year later it might probably be finished as soon, or nearly as soon, as the Prongs Lighthouse, and Captain Sulivan's suggestion, that by the employment of direction beams of colour from the Sunken Rock light the Channel might be so well marked as to dispense with both Light Ships, be carried out simultaneously with the exhibition of the new Prong's light. This, however, is a nautical, rather than an engineering question, and I allude to it only to show how the whole system may be brought to bear if approved by the nautical authorities. The establishment of the Prong's light, however, I take to be a question independent of any possible future change in the floating lights, and connected with the latter only so far as it will facilitate that change if on other grounds it be considered desirable."

Marine.—G. R. No. 337 of 13th May 1864.

17. The orders of Government on the above were as follows:—

"Beside the Port Fund, the Pilotage Receipts have been placed at the disposal of the Harbour Board, and these have hitherto exceeded the expenditure by above Rs. 50,000 per annum.

"If the cost of the Kennery Lights cannot be defrayed therefrom, the matter must be clearly explained for the satisfaction of the Government of India.

"The Government would of course be willing to advance the money, if necessary, on a clear understanding of repayment by instalments.

"The Government quite agrees in the proposal to build the double Lights at Kennery Island, and to remove the Colaba Lighthouse to the spot indicated in the Board's letter."

18. Upon this the Harbour and Pilotage Board addressed the following representation to Government:—

No. 68 of 13th June 1864.

"With reference to the Government Resolution No. 337 of the 13th ultimo, the Bombay Harbour and Pilotage Board request the favour of an intimation of the measures which are in progress for commencing the new Lighthouses at Colaba and Kennery, and for bringing the work to an early completion. The Board regret to learn that it is in contemplation the works should be executed from the funds at present at their disposal, as these are quite inadequate to meet the outlay, nor have the Board any authority as a corporate body to raise money by loan for the purpose upon the future revenues of the Port Funds.

"2. The Board are of opinion, as a large surplus has for many years past been derived from Pilotage, and from those sources of Harbour revenue which existed before the Port Funds Act was brought into operation, and which surplus it is possible may have from time to time been credited to the Imperial Revenues, that the cost of the new works may with propriety be devolved upon the State, to be defrayed out of profits which have so accrued; otherwise the Board do not see how the Lighthouses can be constructed, for it is within the recollection of His Excellency in Council that the whole balance of the Bombay Port Fund up to the close of 1862-63 has already been appropriated by Government in anticipation of the reclamations at Modee Bay, and to require the Harbour Board to construct the new Lighthouses out of the current revenues of the Fund would be simply to defer for several years the completion of works which have been on all sides unanimously pronounced to be of the most emergent necessity.

"3. Should Government nevertheless be of opinion that the current revenues of the Port Fund should bear the cost of the new Lighthouses, the Board request the favour of being informed in connection with paragraph 1 of this letter of the officers by whom the estimates are being framed, the probable amount of the latter, and the amount of the annual instalment which the Board would be expected to pay back in liquidation of any advance which Govern-

ment may be disposed to make in order to secure the immediate commencement of the work.

"4. The Board in conclusion beg to lay before Government their opinion that it is desirable the whole unclaimed Foreshore of the Harbour should be placed at their disposal for the benefit of Harbour Improvements, as is the case under similar circumstances throughout the United Kingdom, and solicit that the necessary instructions to this effect may be issued."

Marine.—G. R. No. 457 of 28th June 1864.

And Government issued on the above the following orders:—

"To the request now repeated that the cost of the Kennery Lights should be defrayed from Imperial Funds, because of the insufficiency of the Port and Pilotage Funds, the Government can only reply as in the Government Resolution No. 337 of 13th May, that the insufficiency must be clearly explained for the satisfaction of the Government of India, without whose sanction His Excellency in Council has not authority to comply with the request.

"2. The Public Works Department will now be requested to prepare plans and estimates of the Kennery Lights, and when the probable cost is known, the means of execution will be reconsidered.

"3. As respects the removal of the Colaba Lighthouse, the 6th paragraph of the Board's letter, No. 44 of 25th April, suggested the postponement of that work until the completion of the Kennery Lights. But the Public Works Department will be requested to prepare an approximate estimate sufficient for decision as to the means of execution.

"4. The request that the whole unclaimed Foreshore of the Harbour should be placed at the Board's disposal for Harbour improvements is not fully understood. If it be meant that it should be at the Board's disposal for sale, or any other such purpose, it cannot be conceded."

19. On the 9th of December 1864 Government received, in the Marine Department, the plans and estimates from the Public Works Department (as called for in the orders, *vide* preceding

paragraph) for the construction of two Lighthouses, one on the Prongs, to cost Rs. 5 lakhs, and the other at Kennery to cost Rs. 2,69,120. The whole of these papers were, on the 28th December 1864, made over to the Harbour Board, with an inquiry if the Board will be prepared with an annual contribution towards the undertaking.

Marine.—G. R. No. 943 of 28th December 1864.

20. The reply of the Board is given below:—

"I am directed by the Harbour and Pilotage Board to acknowledge the receipt of the Government Resolution in the Marine Department, No. 943 of the 28th ultimo, on the proposed new Lighthouses.

No. 22 of 22th January 1865.

"2. The following are the average receipts and disbursements per annum of the Funds at the Board's control:—

	Receipts. Rs.	Disbursements. Rs.
Port Fund.....	1,20,000	1,02,580
Pilotage	1,46,000	66,480
Total....	2,66,000	1,69,060
	1,69,060	
Estimated annual surplus . . Rs.	96,940	

"3. Out of this estimated surplus repairs to wharves and all extraordinary expenses in connection with the Harbour have to be met, and these it is apparent will increase instead of decrease annually with the growth of the Port.

"4. It will therefore be evident to His Excellency in Council how very small the sum is at the Board's disposal for the construction of important and extensive works such as the Lighthouses under consideration.

"5. It is also to be borne in mind that the Board has been started by Government almost without any surplus balance in its favour; that the surplus of previous years, both from the Port Fund and Pilotage, has been retained by Government; that the latter is also absorbing the profits derivable from the sale and reclamation of the Foreshore of the Harbour; that no Harbour improvements to

speak of have up to the present day been effected by Government, and that those which are essentially required, such as Lighthouses, have yet to be completed.

"6. The Board is therefore respectfully of opinion that all the important and extensive improvements should be largely aided by Government from the surplus of previous years, and the profit above adverted to now in its hands, and consider that the sum of Rs. 7,69,120, now required for the Lighthouses, would form a very inconsiderable deduction out of the said profit.

"7. Nevertheless should His Excellency in Council still maintain that the existing reserve of the Board is fairly liable for a portion of the proposed outlay, the Board directs me to state that it will be ready to contribute to the extent of Rs. 50,000 per annum out of the surplus mentioned in paragraph 2 for such time as Government may consider necessary.

"8. It is indispensable, however, that the work of the Lighthouses should be proceeded with, and brought to a conclusion with as little delay as possible, the funds for the purpose being advanced by Government."

And upon this Government ordered that copies of the correspondence on this subject, with the plans and estimates, should be sent to the Government of India, with a recommendation that the cost of the Lighthouses may be defrayed by Government in the first instance, repayable at the rate of Rs. 50,000 per annum from the Harbour Funds.

Marine.—G. R. No. 177 of 27th March 1865.

21. On the 5th August 1865 a copy of the correspondence since February 1864, as given above (beginning with the letter of the Harbour Board No. 106 of 1864, paragraph 15 ante, and ending with letter to the Government of India No 177 of 1865) was sent to the Secretary of State, with the remark that "it will be seen that the final proposals of the Harbour Board agree with the recommendations of Admiral Sulivan, excepting that they maintain their recommendation for a double light at Kennery Island for the sake of more certain distinction from the Colaba Lighthouse and the floating lights."

Marine.—No. 28 of 5th August 1865.

22. Due provision was made in the Imperial Budget 1865-66* of the Bombay Presidency for the construction of the Lighthouses on the Prongs and at Kennery; but until the formal sanction of the Government of India was received no steps towards the commencement of the work could be taken.

* Items 192 and 193.
P. W. D.—G. R. No. 1546 of 18th July 1865.

23. The reference to the Supreme Government, which was made in the letter No. 177 of 27th March 1865, in the Marine Department (see paragraph 20 ante) was replied to by the Government of India as follows :—

No. 685 c | of 8th July 1864.

"I am directed to acknowledge receipt (by transfer from the Home Department) of your letter No. 177, dated 27th March last, submitting plans and estimates for two Lighthouses for the Bombay Harbour, one on the Prongs and the other at Kennery Island, and asking sanction to the cost of the works (Rs. 7,69,120) being defrayed in the first instance from Imperial funds, repayable from the Bombay Harbour Funds at the rate of Rs. 50,000 per annum.

"2. In reply I am directed to state that the Governor General in Council is clearly of opinion that the arrangement proposed of advancing from the Imperial revenue the fund required for the construction of the Lighthouses in question, to be repaid from the Port fund in fifteen years, would involve the same difficulties financially as constructing the works absolutely out of Imperial revenue. The immediate provision of 7⅔ lakhs would be just as inconvenient, and the subsequent repayment of half a lakh a year would be of little use to the finances, while it would hamper and interfere with the action of the new Port trust.

"3. In sanctioning the Port Fund for Bombay, and requiring that from it should be met the Port charges of all sorts, including lighting, reference was not intended to large projects, such as those now submitted, but only to the ordinary charge for maintaining and repairing Lighthouses and ordinary improvements. There appears therefore to be no bar, as the Government of Bombay seems to understand, to undertaking these projects as Imperial works.

"4. And moreover it seems to the Government of India that the construction of these Lighthouses is a work which can very properly be carried out from the special fund for improving Bombay, created from the proceeds of the sale of land in that island. If therefore on the review of the prospects of this fund lately ordered it is found that it will meet the charges proposed to be debited to it, leaving a reasonable surplus, His Excellency in Council is of opinion that these Lighthouses may also be included among the works debitable to it, and the projects should be submitted accordingly.

"5. Otherwise it would remain to include the projects in the usual away in the Imperial Public Works Budget, if their claims are considered sufficiently urgent, to displace other works, and if not of sufficient urgency to be so dealt with the work should be postponed."

24. This letter being transferred to the Public Works Department for consideration, the following representation was addressed to the Government of India from that Department on the 7th October 1865:—

P. W. D.—No. 2147 of 7th October 1865.

"I am directed to acknowledge your letter No. 685c, dated 8th July 1865, to this Government, in the Marine Department, conveying the orders of the Government of India on the subject of undertaking the construction of the Lighthouses on the Prongs and at Kennery from the sale of Land Fund.

"2. In reply I am directed to observe that the state of this special fund having been minutely reviewed by this Government in its letter No. $\frac{1050 \text{ C.W.}}{2070}$, dated 28th ultimo, in accordance with the wishes of the Government of India, it is hoped by this Government that no further objection will be taken by the Government of India to the immediate commencement of these most necessary Lighthouses, which may be undertaken as a debit to the sales of Land Fund.

"3. With reference to the observations of the Government of India, that the Lighthouse should not be charged to the Port Funds, contained in the 3rd paragraph of your letter under acknowledgment,

I am desired to say that this Government will not press the matter of debiting the work to that source, especially as it is now proposed to defray the necessary expenditure from the sales of Land Fund.

"4. Should the Government of India sanction the immediate commencement of the Lighthouses, I am desired to observe that the funds required in this year will be met by a re-appropriation from the grant passed for the Moody Bay Reclamation in the current Budget, and on this point early orders are requested."

25. On a strongly worded representation having been received by Government from the Harbour Board as to the delay in beginning the Lighthouses, the Government of India was written to again asking for an early disposal of the subject.

P. W. D.—No. 2516 of 11th December 1865.

26. In the meanwhile a reply, as below, was received from the Secretary of State, in the Public Works Department, to the Marine despatch No. 28 (see paragraph 21 ante) :—

No. 32, dated 30th November 1865.

"Your Excellency's Marine despatch No. 28 of 5th August last, on the subject of the lighting of Bombay Harbour, intimates that on receipt of the sanction of the Government of India to the construction of the proposed Lighthouse you intend to request that the lanterns may be made in England. I observe, however, that the Lighthouses in question include two to be built on Kennery Island, the construction of both of which your Harbour Committee continue to recommend, notwithstanding that both Admiral Sulivan and Mr. Parkes, C.E., when referred to, gave it as their decided opinion that a single Lighthouse would be amply sufficient.

"2. Your Committee's reason for adhering to their original view is stated to be their desire to ensure 'more certain distinction from the Colaba Lighthouse and the Floating Light,' but I am desirous of being more particularly informed of their reasons for doubting the adequacy of the means for that purpose suggested by Admiral Sulivan."

27. A copy of this Despatch was sent to Captain Barker, Master Attendant and Conservator of the Port, who, in reply, addressed Government as follows :—

"I regret that so long a period should have elapsed from the receipt of your letter No. $\frac{53\ C.\ W.}{12\ W.}$ of 1866, dated Bombay Castle, 13th January 1866; by some mistake the letter was mislaid. The copy of Despatch alluded to in the 2nd paragraph of your letter has not been received, or, at all events, cannot be found; I should feel obliged if you could furnish me with another copy.

No. 75, dated 21st February 1866.

"2. I am of opinion that there does not exist any necessity for a double light on Kennery; in fact, as will be shown hereafter, it would be likely to prove injurious. A *single Lighthouse* would answer every purpose, provided it is made as distinct as possible by night as well as by day from the Lighthouse proposed to be erected on the end of the S. W. Prong.

"3. I would propose that an Iron Lighthouse Tower, 80 feet above the highest part, or near the centre, be erected on Kennery Island. This would give an elevation of 180 feet above the level of the sea. That this Tower be four-sided, and that it be painted in alternate red and white bands, each 10 feet wide from base to lantern platform.

"4. That the light displayed be a bright white light of the first class *fixed*. It would be seen in ordinary weather. This would not only be a guide on approaching the Port from the south, but from all directions.

"5. The objections to a double light on Kennery are, that the Island is so small that the light could not be placed sufficiently far apart to be always distinguished as 'double lights' if 1st class lights are used, and any others would be of little or no avail to prevent the frequent shipwrecks and disasters that have of late years occurred, for their rays would mingle and seem as one light until very close to them; this would be likely to lead to disaster. I would further propose that a round Lighthouse Tower be erected of *stone* on the end of the S. W. Prong, where it dries at ordinary low-water spring-tides; that the lantern platform be 150 feet above low-water mark; that it be painted *white* from base to summit.

"6. The light displayed therefrom should be a revolving light of the 1st class. (The present light I believe to be a 2nd class

light). This would be seen from a ship's deck in ordinary weather about 21 miles, and would be seen close in with the shore to the North as far as its range extends; the present light is shut in white, Malabar Point, some 6 or 7 miles from the shore (*vide* chart accompanying the Harbour and Pilotage Board's letter regarding the wreck of the *Jeddo*).

"7. These two Lighthouses would be so perfectly distinct the one from the other, both by night and day, that I cannot conceive it possible the one could at any time be mistaken for the other.

"8. I would again refer to the chart. Every seaman, nay every landsman, must be aware of the great advantage of 'transit' bearings, that is directing the course of a vessel by having two well known objects in line with each other.

"9. A ship making the Port from the southward would keep the Lighthouse on Kennery on the starboard or right hand, and long before she approaches that Island the outer Light Vessel and the Prong Lights will be seen. These being kept in 'transit' would lead her well clear of Kennery island and flat.

"10. A vessel approaching the Port from the northward would keep the Prong Light on the port or left hand, and long before she approaches the Prongs the outer Light and Kennery Light would both be seen. These being kept in 'transit' would lead the vessel over the verge of the foul ground off the Prongs, therefore the seaman would keep the Kennery Light well clear to seaward of the outer Light.

"11. The outer and inner Light Vessels are admirably placed as to distance from each other (4¾ miles); the Prongs and Thull Shoal, a direct course between the two Light Vessels, would carry a vessel just clear of the pitch of the S. E. Prong.

"12. Many improvements have been made since these vessels were built, both as regards vessels and lighting apparatus during the S. W. monsoon. When her services are most required, the outer Light Vessel is almost useless at times from the heavy rolling of the vessel. The Lantern cannot be kept at its proper elevation, and even when lowered the lamps require constant trimming.

"I trust I may be pardoned for this long digression. The importance of the subject is the only excuse I have to offer."

28. Captain Barker's foregoing letter was sent to the Secretary of State on the 15th March 1866, with the remark of this Government that as Captain Barker now concurred with the views expressed by Admiral Sulivan as to the preference of a single fixed light to a double one, there seemed to be no reason why these proposals should not be at once sanctioned.

P. W. D.—No. 6 of 15th March 1866.

29. Further representations from the Harbour Board, pointing out the serious losses of ships from the continued want of proper lighting of the Harbour, led to the following letter to the Government of India on the 14th March 1866:—

P. W. D.—No. 466 of 14th March 1866.

"In continuation of my letter No. $\frac{1528 \text{ C. W.}}{3516}$ of 11th December 1865, I am directed by the Honourable the Governor in Council to forward copies of two further letters, as per margin, from the Harbour and Pilotage Board, urging upon the consideration of Government the speedy construction of the Lighthouses at Kennery and on the South-West Prongs.

Nos. 60 and 80 of 1866, and accompanying chart.

"2. His Excellency the Governor in Council, I am to observe, fully concurs with the Harbour Board in their opinion as to the very great necessity of supplying adequate lighting arrangements to this Port, and I am to solicit the sanction of the Government of India to the proposal by the Board to erect at once, at the cost of the Port Fund, an Iron Lighthouse at Kennery, the work to be under the Board's direct supervision.

"3. The favour of the early reply of the Government of India to this letter is requested."

30. The replies of the Government of India to the several representations by Government are to be found below in extenso: they are dated respectively the 29th March and 27th April 1866:—

No. 334 | C of 29th March 1866.

"I am directed to acknowledge your letters Nos. $\frac{1116 \text{ C. W.}}{2147}$ and $\frac{1528 \text{ C. W.}}{3516}$, dated respectively the 7th October and 11th December 1865,

urging the immediate construction of Lighthouses on the S. W. Prongs, Kennery Island, and in reply to state, with reference to the Despatch from the Secretary of State to the Bombay Government, No. 32 of 30th November last, that the Government of India must defer according sanction to the project for the erection of these Lighthouses until the decision of the Home Government is known in regard to the character of the Light to be exhibited on Kennery Island.

"2. It is further to be marked that from the latest information there does not appear to be any immediate prospects of money being available from the special fund."

No. 376 | C of 27th April 1866.

"In reply to your letter No. $\frac{202\ C.\ W.}{406}$, dated the 14th March 1866, urging the speedy construction of the Lighthouses at Kennery and on the S. W. Prongs, Bombay, I am directed to refer you to Public Works' Department letter No. 334C. of 29th idem, and to state that until the question of the character of the Light is decided on by the Home Government the Government of India is unable to accord sanction to the commencement of the work.

"2. The Rs. 50,000 set apart by the Harbour and Pilotage Board for the erection of the Lighthouses will, I am to remark, be of little use unless the Board can supply the rest of the money needed for this purpose. It would appear that the prosecution of the work, even after receipt of sanction from England, must depend on the state of the special fund as alluded to in the 2nd paragraph of the letter above referred to."

31. On receipt of the last letter from the Government of India, a telegram was sent to Earl de Grey, Secretary of State, asking "Is the Light on Kennery to be single or double, flashing or fixed?"

No. 9 of 4th June 1866.

32. To this the following reply was received from the Secretary of State, dated 4th June 1866:—

"I have received your Excellency's telegram of 16th ultimo, inquiring whether the Light on Kennery Island in Bombay Harbour is to be single or double, flashing or fixed.

"2. This is a question for which a brief telegraphic reply will scarcely suffice.

"3. It has been finally determined that there shall be only one Lighthouse, instead of two, on Kennery Island; but the suggestion that the light should be fixed appears to have originated with Admiral Sulivan, who, however, recommended it only on condition that the Colaba Light should be flashing, and the outer floating light revolving. An alternative proposal of Admiral Sulivan was that at Colaba there should be a one-minute revolving dioptric light, and on the Kennery Island a ten-second flashing dioptric light. The decision, with respect to Kennery Island, would seem therefore to depend on what may be done at Colaba. Your despatch No. 6 of 15th March last, referred to in the telegram under reply, signifies your concurrence in Admiral Sulivan's preference of a single fixed light for Kennery Island, and if it is hence to be inferred that the Colaba Light is to be flashing, I also join in your conclusion."

And a copy of this Despatch was sent to the Harbour Board, with a request that they "will state which of the alternative plans they would recommend for adoption, and further, whether the Board are prepared with funds to undertake and complete the proposed light at Kennery."

P. W. D.—No. 1636 of 12th July 1866.

33. The Harbour Board replied as follows:—

No. 346 of 20th July 1866.

"With reference to your letter No. $\frac{\text{C84 C. W.}}{\text{1636 M.}}$ of 1866, dated the 12th instant, forwarding Despatch No. 9, dated 4th June last, from the Secretary of State for India, on the subject of lighting the Bombay Harbour, and requesting me to state which of the two alternative plans therein alluded to the Board would recommend for adoption, and whether they are prepared with funds to undertake and complete the proposed Light on Kennery, I have the honour, by desire of the Harbour and Pilotage Board, to state, in regard to the 1st inquiry, for the information of His Excellency the Governor in Council, that they concur in the views of Government, viz. that the *Kennery* should be a *bright white light of the*

1st class fixed; the light on *the end of the South-West Prong* to be a *10-second flashing 1st class light,* and the *outer Floating Light Ship* to be a *red fixed light.*

"2. As regards the 2nd question, the Board direct me to state that they are prepared with funds to undertake and complete the proposed light on Kennery, provided the entire management of its design and erection is left to them. If Government will sanction this arrangement at once, the Board will send instructions to Captain Young, C.B., one of their late colleagues, by next mail, ordering out the light, which they trust will then be in position before the next South-West monsoon."

P. W. D.—No. 1893 of 6th August 1866.

34. To the foregoing Government replied as below:—

"I am directed by the Honourable the Governor in Council to acknowledge the receipt of your letter No. 346 of the 20th ultimo, conveying the Board's opinion on the description of lights (as recapitulated in the margin) to be used at Kennery and elsewhere at the entrance of the harbour, and stating that the Board is prepared to undertake the immediate construction, at its sole cost, of the Lighthouse, &c. at Kennery.

Kennery—White light—1st Class *Fixed. S. W. Prongs*—Do.—10-Second—*Flashings. Outer Light Ship*—Red Light *Fixed.*

"2. In reply I am desired to observe that Government concur in the Board's proposal to undertake the building at Kennery, but as regards the kind of lights to be used, I am to point out that the Secretary of State's Despatch No. 9, dated 4th June 1866, has allowed a *Fixed* light on Kennery only on the condition that the Colaba light should be *flashing,* and the outer floating light *revolving.*

"3. On this point I am desired to inquire of the Board whether they agree to Admiral Sulivan's proposal, or wish for a further reference to England."

35. Referring to the Government of India's letter No. 376 | C of 27th April last (see paragraph 30 ante), the Government of Bombay addressed a further letter to the Government of India on the 13th July 1866, pointing out that another wreck had occurred on the S. W. Prong

P. W. D.—No. 1640 of 13th July 1866

in June last, and that in the opinion of the naval authorities the mishap must be attributed to the imperfect manner in which the approaches to the Harbour are lighted and marked.

36. It should here be noted that in a recent correspondence between Government in the Marine Department and the Harbour Board (relative to the means at the disposal of the Board to assist in the event of wrecks) the Board made the following observation on the 19th July 1866:—"The Board distinctly desire to place on record that they can in no way hold themselves responsible for these or any future wrecks that may occur from want of a light on the Island Kennery.

"Next in importance to the light on Kennery, the Board consider a new Lighthouse, with a 1st class light, should be erected near the end of the S. W. Prong at Colaba, as already recommended.

"The erection of these two lights would be a safeguard to shipping entering the Harbour, and tend largely to prevent wrecks."

37. The Government of India replied on the 27th July 1866 as follows to the last representation from this Government, No. 1640 (see paragraph 35 ante):—

No. 652 | C of 27th July 1866.

"I am directed to acknowledge receipt of your letter No. $\frac{588 \text{ C. W.}}{1640 \text{ M.}}$ dated 13th July 1866, regarding the early commencement of work on the Lighthouse on the S. W. Prong, Bombay Harbour, and in reply to state that the Governor General in Council regrets that in the present state of the finances he is unable to sanction an extra grant for this work, but will be prepared to authorise any re-appropriation of funds from Civil Works which the Government of Bombay may desire to recommend in view to carry it out.

"2. I am to add that if the Government of Bombay is prepared to arrange for carrying on the work in the manner suggested, a plan and estimate should be at once submitted for sanction, the preparation of materials being meanwhile proceeded with."

38. The Harbour Board in the meanwhile, in reference to G. L. No. 1895, of 6th August 1866, replied as below on the 10th idem:—

No. 394 of 10th August 1866.

"With reference to your letter No. $\frac{790 \text{ C. W.}}{1895}$ of 1866, dated 6th instant, I have the honour, by direction of the Harbour and Pilotage

Board, to state for the information of His Excellency the Governor in Council that although the Board are of opinion that the outer Floating Light should show red when the light on Kennery Island is exhibited, so as to make a marked distinction between the outer Floating Light and the Colaba or Prongs' light, the Board will forego their opinion on this point, and agree with Admiral Sulivan, sooner than delay the erection of the light on Kennery, so much importance do they attach to its speedy completion.

"I am instructed by the Board to ask the sanction of His Excellency in Council to their at once taking this work in hand without further reference to England."

39. Government thereupon authorised the commencement of the Lighthouse at Kennery in the following letter, dated 16th August 1866, addressed to the Harbour Board:—

P. W. D.—No. 1992 of 16th August 1866.

"I am directed to acknowledge the receipt of your letter No. 394, dated 10th instant, stating that sooner than delay the erection of the Light on Kennery, the Harbour Board will forego their own opinion, and agree to the arrangement of Lights recommended by Admiral Sulivan. In reply I am to inform you that on these conditions the Light on Kennery may at once be proceeded with."

and forwarded a copy of the correspondence, ending with the foregoing letter to the Harbour Board to the Secretary of State for India, on the same day.

P. W. D.—Despatch No. 27 of 16th August 1866.

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